

Julie M. Hogan

2301 Beau Monde Ln #208, Lisle IL, 60532 • (925) 708-2108 • jmhogan@fnal.gov

- Profile:**
- Postdoctoral researcher experienced in new physics searches, heavy flavor asymmetry measurements, and missing energy algorithms for a hadron collider experiment.
 - Analysis techniques: ROOT, minimization fits, multivariate tools, Monte Carlo generation.
 - Computing skills: Unix, C/C++, Python, grid computing (PBS, Condor), LaTeX, and HTML.
- Employment:**
- Postdoctoral Research Associate
Brown University, Providence RI
2015 – present
- Education:**
- Rice University, Houston TX
Ph.D. in Physics, 2015
M.S. in Physics, 2012
 - Vanderbilt University, Nashville TN
B.A. in Physics, 2009
Honors in Physics, *summa cum laude*
- Research Interests:**
- Searching for new physics: rare decays, new phenomena, dark matter candidates, or other evidence of physics beyond the Standard Model.
 - Neutrino physics: expanding knowledge of the lepton sector and searching for CP violation.
 - Increasing experience with detector hardware and computing/triggering systems.
 - Creating useful software with reliable documentation for new collaborators and students.

Research Experience:

- CMS Collaboration – *Beyond Two Generations Analysis Group* 2015 – present
- Analyzed 13 TeV data collected during 2015 to search for pair production of vector-like top quark partners with electric charge 5/3 and 2/3, replicating the cross section sensitivity achieved in Run 1 at 8 TeV.
 - Spearheaded efforts to resolve problems in 13 TeV simulation in high momentum topologies.
 - Produced two preliminary results for conference presentations, currently leading analysis group toward a combined publication.
- CMS Collaboration – *Outer Tracker Online Group* 2015 – present
- Reconnected silicon strip tracker data acquisition systems to the Cosmic Rack test stand at CERN, used to test tracker performance and software independent from the CMS detector.
 - Analyzed optical gain scans taken over the course of Run 1 to investigate observed signal losses.
 - Currently automating analysis of commissioning test runs and developing an analysis framework to study heavily ionizing particle deposits in the silicon strip tracker.
- DØ Collaboration – *Heavy Flavor group* 2013 – 2015
- Measured the forward-backward asymmetry in B^\pm production by reconstructing $B^\pm \rightarrow J/\psi K^\pm$ decays.
 - Performed track-based reconstruction of heavy flavor decays in a C++ framework and extracted the asymmetry from an unbinned maximum likelihood fit.
 - Calculated detector reconstruction efficiencies for J/ψ and K^\pm , using simulation and data-driven techniques.
 - Generated next-to-leading-order Monte Carlo to simulate the standard model asymmetry.
 - Utilized object-oriented programming, ROOT tools for fits and graphics, and multivariate techniques.
- DØ Collaboration – *Calorimeter Algorithms group* 2011 – 2012
- Updated and improved missing energy algorithms, specifically the missing energy significance algorithm that requires energy resolution models for reconstructed particles, jets, and unclustered energy.

- Calculated energy resolution functions for unclustered energy in RunII of the Tevatron collider.
- Developed a missing momentum algorithm for $D\bar{O}$ based on tracks rather than calorimeter objects.

$D\bar{O}$ Collaboration – *Luminosity group*

2010

- Tested photomultiplier tubes and prepared plastic scintillator for the final $D\bar{O}$ luminosity monitor.
- Assisted in installation of the luminosity monitor and in-situ performance checks.
- Studied effects of various radiation scenarios on plastic scintillator using Monte Carlo simulations.

Mu2e Collaboration

2009

- Developed 3D ROOT models of a proposed Mu2e calorimeter.
- Added a class to the Mu2e software that returns magnetic field values interpolated from a field map.

Vanderbilt University – *High Energy Physics group*

2007 – 2009

- Optimized the REDDnet data logistics network for the CMS Tier-3 data center (now Tier-2) at Vanderbilt.

Lawrence Livermore National Laboratory – *Beam Research group*

2007

- Modeled surface flashover of annular dielectrics in high gradient electric fields for development of the Dielectric Wall Accelerator, a compact accelerator designed for proton radiation therapy.

Teaching Experience:

Rice University, *Teaching Assistant*

- PHYS 125 General Physics I (mechanics) Fall 2010
- PHYS 126 General Physics II (optics, electromagnetism) Spring 2010, 2011
- Taught the laboratory portion of undergraduate General Physics, demonstrating procedures to thirty students per section and grading written reports. Instructed five laboratory sections over three semesters.

Awards &

Achievements:

- James Chadwick Diploma, 53rd International School of Subnuclear Physics 2015
- Young Scientist Forum travel grant, Rencontres de Physique de la Vallée d'Aoste 2015
- Young Scientist Forum travel grant, Rencontres de Moriond Electroweak 2014
- Sponsored by U.S. Department of Energy to attend the Lindau Nobel Laureates Meeting in Lindau, Germany. 2012
- Phi Beta Kappa, Vanderbilt University 2009
- Underwood Memorial Scholarship, Vanderbilt University Dept. of Physics 2009
- McMinn Scholarship, Vanderbilt University Dept. of Physics 2007 – 2009

Activities &

Committees:

- Member of a CMS Analysis Review Committee 2016
- LPC Physics Forum co-convenor 2015 – present
- Physics Performance & Dataset contact for the B2G group 2015 – present
- $D\bar{O}$ Tour Guide 2013 – present

Conference

Presentations:

- “Vector-like Quark Searches with Boosted Object Reconstruction in CMS”, BOOST 2016: 8th International Workshop on Boosted Object Phenomenology, Reconstruction, and Searches in HEP, July 22, 2016.
- “Measurement of the Forward-Backward Asymmetry in B^\pm Meson Production in $p\bar{p}$ Collisions at $D\bar{O}$ ”, 53rd International School of Subnuclear Physics, June 27, 2015.
- “Measurement of the Forward-Backward Asymmetry in the Production of B^\pm Mesons in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ TeV”, 29th Rencontres de Physique de la Vallée d'Aoste, March 4, 2015.
- “Forward-Backward Asymmetry of $B^\pm \rightarrow J/\psi K^\pm$ Decays at the $D\bar{O}$ Experiment”, 49th Rencontres de Moriond Electroweak, March 17, 2014.

Selected

Publications:

- CMS Collaboration, “Search for pair production of vector-like T quarks in the lepton plus jets final state”, CMS-PAS-B2G-16-002 (2016). <http://inspirehep.net/record/1434352>.

- CMS Collaboration, “Search for top quark partners with charge 5/3 at $\sqrt{s} = 13$ TeV”, CMS-PAS-B2G-15-006 (2015). <http://inspirehep.net/record/1409804>.
- J. M. Hogan, “Measurement of the Forward-Backward Asymmetry in the Production of B^\pm Mesons in $p\bar{p}$ Collisions”, Doctoral Thesis, Rice University, FERMILAB-THESIS-2015-01 (2015). <http://inspirehep.net/record/1345128>.
- DØ Collaboration, “Measurement of the Forward-Backward Asymmetry in the Production of B^\pm Mesons in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ TeV”, Phys. Rev. Lett. 114 05813 (2015).
- V.M. Abazov *et al.* (DØ Collaboration), “Search for the standard model Higgs boson in $\ell\nu + \text{jets}$ final states in 9.7 fb^{-1} of $p\bar{p}$ collisions with the D0 detector”, Phys. Rev. D **88** 052008 (2013).
- Julie M. Hogan, “Missing Energy Studies at the DØ Experiment.” Master Thesis, Rice University (2013). <http://scholarship.rice.edu/handle/1911/71660>.
- J. R. Harris, D. Blackfield, G. J. Caporaso, Y. J. Chen, S. Hawkins, M. Kendig, B. Poole, D. M. Sanders, M. Krogh, and J. E. Managan, “Vacuum Insulator Development for the Dielectric Wall Accelerator”, J. Appl. Physics **104** 023301 (2008).

References:

- | | |
|---------------------------|----------------------------|
| • Prof. Meenakshi Narain | meenakshi_narain@brown.edu |
| • Prof. Ulrich Heintz | ulrich_heintz@brown.edu |
| • Prof. Marjorie Corcoran | corcoran@rice.edu |
| • Dr. Peter Garbincius | peterg@fnal.gov |
| • Dr. Leo Bellantoni | bellanto@fnal.gov |
| • Dr. Mark Williams | mark.williams@cern.ch |